

Amendments to the Drawings:

The attached sheets of drawings include changes to Figs. 1, 3, 5, 15A and 15B. These sheets, which include Figs. 1, 3, 5, 15A and 15B, replace the original sheets which included Figs. 1, 3, 5, 15A and 15B.

Attachment: Replacement Sheet

Remarks

Claims 1-23 are pending in the application. Claims 18-20, 22 and 23 are rejected. Claims 1-17 and 21 were withdrawn from consideration, and are, by this paper, canceled. Also by this paper, claims 24-37 are added. Based on the following, consideration of the new claims and reconsideration of the remaining claims are requested.

Drawings

The Examiner objected to the drawings because, "some of the drawings are difficult to interpret due to the poor lining;" the Examiner stated that replacement sheets were required. By this paper, replacement drawing sheets are provided for Figures 1, 3, 5, 15A and 15B. Applicant believes that the new drawings and the remaining original drawings meet all requirements and respectfully requests that the objection be withdrawn.

Specification

By this paper, the specification is amended at page 21 to correct the inadvertent transposition of the words "motor" and "pump". A reading of the specification, which describes in detail the function of a hydraulic pump-motor, makes it clear that in this one instance, the words "motor" and "pump" were reversed. In addition, language similar to that found in the specification on page 21 is included in original claim 12 (now canceled), and this confirms that the words in the specification were inadvertently transposed. Thus, no new matter was introduced by this amendment to the specification, and its entry is respectfully requested.

Claim Rejections—35 U.S.C. § 103

The Examiner rejected claims 18-20, 22 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Japanese Publication No. JP8-144927 ("the Japanese Publication") in view of U.S. Patent No. 3,908,519 (Born et al.) and U.S. Patent No. 6,537,047 (Walker). Applicant

notes that with this paper, an information disclosure statement is filed that includes a translation of the Japanese Publication. The translated Japanese Publication indicates that the Examiner's presumption was correct that the radial piston motor described in the Japanese Publication can also be used as a pump. Applicant notes, however, that switching between a motor mode and a pump mode requires that the high pressure and low pressure input and output ports be reversed. For example, beginning in paragraph 14, the specification of the Japanese Publication describes the use of the machine as a motor. In paragraph 22 it specifically states that the high pressure port is labeled 3A and the low pressure port is labeled 3B. This is illustrated, for example, in Figure 2. In contrast, paragraph 35 describes the use of the machine as a radial piston pump, and in paragraph 37 states that the fluid input port is labeled 3A and the output port is labeled 3B. Because the output of a pump is at a higher pressure than the input, the high and low pressure ports of the machine operating as a pump are exactly reversed from the high and low pressure ports of the machine operating as a motor.

In contrast, independent claims 18 and 20 recite the use of a rotatable valve plate that can alternatively connect the cylinders of the hydraulic machine with the high and low pressure ports, thereby changing between operation modes without having to go to the time or expense of externally switching the high and low pressure ports on the outside of the machine housing. With regard to the Walker reference, Applicant first notes that the issues associated with the design and use of a vane pump, such as described in the Walker reference, can be markedly different from those encountered in the design and use of a radial piston pump, such as claimed in the present application. As such there is no teaching, suggestion, motivation, or other valid reason to combine the cited references.

To the extent the references are combined, however, Applicant notes the following. In order to effect a change between a pump mode and a motor mode, the vane pump described in the Walker reference uses a component called a "chamber ring 86", which is separate from and in addition to first and second end plates 70, 76, which contain various fluid ports. Thus, even the combination of references does not teach or suggest a piston-based hydraulic machine that includes a valve plate that provides the function of both allowing fluid passage between the cylinders and high and low pressure ports, and also is configured to effect a change

between motor and pump modes in the hydraulic machine. As recited in claims 18 and 20, the present invention provides a hydraulic pump-motor that can switch between operating modes without switching the high and low pressure ports externally, and it does so without using an additional component such as the chamber ring described in the Walker reference. Therefore, Applicant maintains that claims 18 and 20 each contain limitations that are neither taught nor suggested by the combination of cited references. Applicant notes that new claims 34-37 have claim 18 as their base claim, and therefore contain all of the limitations of claim 18, as well as additional limitations that further distinguish them from the cited references. Applicant therefore submits that claims 18, 20 and 34-37 are patentable over the cited combination of references.

Claim 19 of the present application recites a hydraulic machine that is a transformer, which includes "a housing having at least three housing ports, each of the housing ports being configured to operate as a fluid inlet or as a fluid outlet...." Unlike the pumps taught by the cited references, the hydraulic machine recited in claim 19 provides greater flexibility with regard to the inlet and outlet ports on the housing. In addition, the hydraulic machine of claim 19 further recites a first plate rotatably driven by a rotor, which has a first surface to contact one end of each of a plurality of cylinders. The hydraulic machine also includes "a second plate having at least three plate ports therein, each of the plate ports being configured to cooperate with at least one aperture in the first plate and one housing port...." This facilitates fluid flow between a housing port and at least one cylinder. Further, the second plate is rotatable relative to the housing ports to modify the pressure ratio of the hydraulic machine. Applicant submits that there is nothing in the combination of the cited references that teaches or suggests all of these claim limitations. Applicant also notes that claim 19 is the base claim for claims 27-33. Each of these dependent claims contains all of the limitations of claim 19, as well as additional limitations that further distinguish it from the combination of references. Therefore, Applicant submits that claim 19 and claims 27-33 are patentable over the cited combination of references.

Claim 22 of the present application recites a hydraulic machine that includes a plurality of pistons, each having a corresponding cam follower, a cam that cooperates with the cam followers, and a rotatable valve plate that is configured to selectively connect the piston cylinders with high and low pressure fluid ports. In addition, claim 22 also recites "a housing

having one portion with the piston cylinders disposed therein, and another portion configured to be disposed substantially around the one portion and including a tapered bore to facilitate sealing of the cylinders...." The tapered bore in the outer portion of the housing can effect a very secure seal for the piston cylinders when it is connected to another portion of the housing. This is described in the specification, and illustrated, for example, in Figure 15A. Applicant submits that the combination of cited references does not teach a hydraulic machine having a housing with the configuration recited in claim 22 of the present application. The additional seal that can be gained through the use of the tapered bore can eliminate the problems associated with fluid leaking from the cylinders when the hydraulic machine is in use. No such advantages are taught or suggested by the cited combination of references. Claim 22 is the base claim for each of claims 23-26. Each of these dependent claims contains all of the limitations of claim 22, as well as additional limitations that further distinguish it from the cited combination of references. Therefore, Applicant submits that claims 22-26 are patentable over the cited combination.

The Petition fee of \$230.00 is being charged to Deposit Account No. 02-3978 via electronic authorization submitted concurrently herewith. The Commissioner is hereby authorized to charge any additional fees or credit any overpayments as a result of the filing of this paper to Deposit Account No. 02-3978.

Respectfully submitted,

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